

REMARKS/ARGUMENTS

I. Claim Status

Claims 1-25 are pending and being examined in this application. Claims 21-22 are cancelled herewith without prejudice or disclaimer. Claims 1, 6, 7, 10, 20, and 24 have been amended without prejudice or admission. Upon entry of the present amendment, claims 1-20 and 23-25 will be pending in the application.

II. Amendments to the Specification

The specification has been amended to correct obvious typographical errors. On page 4, lines 23-24, the numbers “3,00,000” and “5,00,000” have been corrected to recite “300,000” and “500,000,” respectively. The number of zeroes within the numerical recitation of the specification clearly indicate that the ranges should be three hundred thousand and five hundred thousand. No new matter is added by way of this amendment.

III. Claim Objections and Amendments

Claims 1, 7, 10, 21-22, and 24 have been objected to for various informalities. These objections are addressed in turn below.

Claim 1 has been objected to because, according to the Examiner, the phrase “minimum temperature of the melting point” is not understood. Claim 1 has been amended to recite “at a temperature no lower than the melting point.” Support for this amendment may be found throughout the specification, and specifically at page 3, lines 29-31.

Claim 6 has been amended to recite proper Markush language.

Claim 10 has been objected to due to the use of the term “preferably.” Claim 10 has been amended to delete the term “preferably” and to recite “ketones having 3-7 carbon atoms.” Support for this amendment may be found on page 3, lines 5-15 of the specification.

Claim 7 has been objected to because, according to the Examiner, sulfonic acids are not carboxylic acids, and claim 7 therefore fails to limit the subject matter of claim 6. Claim 7 has been amended to delete the phrase “aliphatic and aromatic sulfonic acids.”

Claims 21-22 have been objected to because, according to the Examiner, the type of molecular weight of the polymer should be indicated. In order to expedite prosecution of the present case, and without conceding the Examiner's position or the validity of the objection, Applicants have cancelled claims 21-22.

Claim 20 has been amended to recite "wherein the comonomer is not HDPE" after olefin. Support for this amendment may be found at page 4, lines 17-25.

Claim 24 has been objected to because, according to the Examiner, it is not clear what is to be exposed to air in line 3 of the claim. Claim 24 has been amended to recite "from the blend" after "by removal of the solvent" in line 3, and to recite "the blend" after "exposing" in line three. Support for these amendments may be found throughout the specification and in particular on page 4, lines 26-31.

The above-made amendments do not introduce new matter.

Based on the foregoing remarks, Applicants submit that each one of the objections has now been obviated. Applicants therefore respectfully request that these objections be withdrawn.

IV. Rejections Under 35 U.S.C. §112, Second Paragraph

Claims 9, 10, and 12 stand rejected under 35 U.S.C. §112, second paragraph as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter that applicant regards as the invention. The Examiner asserts that it is not clear from the specification that hydrocarbons of 5-15 carbon atoms, mixtures of hydrocarbons, aromatic hydrocarbons, petrol, kerosene, and ketones having three to seven carbon atoms are suitable for dissolution of metal carboxylates. The Examiner interprets the aromatic hydrocarbons and ketones to be nonsolvents. The Examiner then concludes that the role of these nonsolvents in dissolving nucleating agents is not understood.

The specification at page 4, lines 4-10, describes solvents broadly to include suitable hydrocarbons, aromatic hydrocarbons, ketones, and various mixtures, as being useful as such solvents for *dissolving* the nucleating agent, including metal carboxylates. The specification also describes solvents suitable for *gelling*, as described at page 4, lines 11-14.

The Examiner's comments about the role of aromatic hydrocarbons and ketones relate to the use of a second solvent for gelling the nucleating agent as described at page 4, lines 11-14, and further exemplified in Examples 1-4. The description of suitable dissolving solvents is broad and there is nothing inconsistent in using the solvents recited in claims 9, 10, and 12 as dissolving solvents. Claim 9 clearly states that the solvent is used for dissolving the nucleating agent. Thus, the claims reflect the use of these terms as defined and supported in the specification.

Based on the foregoing remarks, Applicants submit that each one of the rejections under 35 U.S.C. § 112, second paragraph, has now been obviated. Applicants therefore respectfully request that these rejections be withdrawn.

V. Rejections Under 35 U.S.C. §102(b)

The Examiner has rejected claims 1-2, 4-9, 11-19, and 23-25 under 35 U.S.C. §102(b) as allegedly being anticipated by Marinaccio (U.S. Patent No. 3,637,634 GB 1,202,835).

According to the Examiner, Marinaccio teaches dissolution of sodium benzoate in water/alcohol to form a gel-like slurry, which is mixed with polypropylene powder. The solvent is then removed from the mixture, as described in col. 3, lines 11-18, and in examples 1-2 of Marinaccio. The Examiner equates the gel-like slurry to a gel. The Examiner notes that alcohols such as isopropanol or methanol are preferred nonsolvent alcohols (col. 3, line 47). Additionally, the Examiner describes that after mixing the polymer/nucleating mixture mechanically, it is dried at elevated temperatures of 30-60°C. The Examiner cites example 3 as teaching a step of injection molding of the polypropylene/nucleating agent. The Examiner concludes that the composition contains a target amount of nucleating agent in the resin of between 0.05-2.0 wt % (col. 4, line 10) and further additives may be included in the gel composition.

Anticipation requires that each and every element of the rejected claim(s) be disclosed in a single prior art reference. *See* MPEP § 2131 (8th Ed., Rev. 4, Jan. 2006). "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros.*

v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

In the Marinaccio process, the sodium benzoate slurry is mixed with polyolefin in a desired quantity, the solvent is filtered out, and the mass dried in a second step to obtain sodium benzoate deposited on polyolefin powder. In this process, the solvent is always water and the precipitant is either alkanol, ketone, glycerol, or aldehyde. In the process of the invention, sodium benzoate is dissolved in alkanol (methanol or ethanol) and is obtained in gel form by adding a non-solvent such as ketone (acetone or MIBK).

In contrast to the slurry of Marinaccio that is mixed, filtered, and the resulting mass dried in a second step, the process of the present invention forms sodium benzoate in nanoparticle size (as described in Example 4) and does not form solid particles on dilution with toluene. Solid particles cannot be filtered from the gel of the present invention. The inventive sodium benzoate gel and solvents are mixed directly into polyolefins in desired quantities and the solvent removed by evaporation.

In contrast, in Marinaccio, the sodium benzoate slurry is mixed in polyolefin and the solvent is filtered. After drying, this composition is added to polyolefins as a nucleating agent.

It is well known in the art that the performance of a nucleating agent such as metallic salts of organic acids (e.g. sodium benzoate) depends on particle size. The lower the particle size, the better the performance of the nucleating agent. In the present invention, sodium benzoate is formed in the nanoparticle size in gel form. As a result, the nanoparticle gel form shows better performance as a nucleating agent, as indicated by the high T_c values shown in Table 1, when compared to the performance of sodium benzoate in powder form or sodium benzoate added to polyolefin in water solution. Thus, the present invention encompasses a novel process that incorporates a nucleating agent into polyolefin in gel form, which is nanoparticle in size.

The process described by Marinaccio, where the sodium benzoate slurry is mixed in polyolefin and solvent filtered, the resulting composition is dried and added to polyolefins as a nucleating agent, does not teach the inventive sodium benzoate gel and

solvents that are mixed directly into polyolefins in desired quantities where the solvent is removed by evaporation.

Thus, Marinaccio fails to anticipate the present invention claims 1-2, 4-9, 11-19, and 23-25. Reconsideration of claims 1-2, 4-9, 11-19, and 23-25 and withdrawal of the rejections of these claims under 35 U.S.C. § 102(b) is requested.

VI. Rejections Under 35 U.S.C. §103(a)

The Examiner has rejected claims 20-22 under 35 U.S.C. 103(a) as allegedly being unpatentable over Marinaccio (U.S. Patent No. 3,637,634/ GB 1,202,835) in view of Lindahl et al. (U.S. Patent No. 6,809,154).

The Examiner describes Marinaccio as indicating that its nucleating gels are suitable for a variety of olefin polymers such as propylene, copolymers of propylene and other olefins, polyethylene, and polybutene. The Examiner concedes that Marinaccio is silent regarding the exact amounts of these constituents.

The Examiner cites Lindahl for teaching compositions with linear polypropylene or HDPE (0.1-10 wt % comonomer) having a weight average molecular weight of 50,000-500,000 that are nucleated with sodium benzoate. The Examiner concludes that combining Marinaccio and Lindahl is obvious because the process of Marinaccio is a general one that works for polypropylenes. Thus, one of ordinary skill in the art would have expected such a combination to work for HDPE resins equally well.

In order to expedite prosecution of the present case, and without conceding the Examiner's position or the validity of the rejection, Applicants have cancelled claims 21-22. Claim 20 has been amended to recite "wherein the comonomer is not HDPE."

Reconsideration of claim 20 and withdrawal of the rejection of this claim under 35 U.S.C. § 103(a) is requested.

Rejections Under 35 U.S.C. §103(a)

Claim 3 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Marinaccio in view of Thompson et al. (U.S. Patent No. 4,178,421).

The Examiner concedes that Marinaccio does not teach heating the dissolved solution to the boiling point of the solvent and allowing the solution to cool. The Examiner cites Thompson as teaching that the concentration of sodium benzoate solution depends on its temperature, since the warmer the solution, the more sodium benzoate can be dissolved up to the saturation point (col. 3, lines 50-57). The Examiner concludes that it would have been obvious to one skilled in the art to improve the solubility of the nucleating agent in the solvent by heating the solvent.

In determining the differences between the prior art and the claims, the question under 35 U.S.C. § 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. Nothing in Marinaccio or Thompson teaches the claimed process for the preparation of nucleated polyolefins, in particular the step of removing the solvent and extruding the mixture at the melting point of the polyolefin, followed by cooling to obtain the nucleated polyolefin. Thus, there is no suggestion in Marinaccio or Thompson to combine or even modify their products to arrive at the claimed invention.

Furthermore, the Examiner's attempt to cure the deficiency Marinaccio with Thompson fails because there is no suggestion in the prior art to combine these references. Both the motivation to combine the relevant elements and the suggestion of success must be found in the prior art to satisfy the requirements for maintaining an obviousness rejection. *In re The Dow Chemical Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988) (“[b]oth the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure”). While not all of the elements of the presently claimed process for preparation of nucleated polyolefins can be found in the cited references, finding various elements piecemeal in separate references is *not* sufficient motivation to combine them to arrive at a claimed invention. *In re Rouffet*, 47 USPQ2d 1453 (Fed. Cir. 1998) (“[T]he examiner must show reasons that the skilled artisan, *confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.*”) (citations omitted, emphasis added).

For at least the reasons set forth above, claim 3' is not obvious over the prior art of record. Reconsideration of claim 3 and withdrawal of the rejection under 35 U.S.C. § 103(a) is requested.

CONCLUSION

Applicants respectfully submit that the amendments and remarks presented here overcome and/or obviate each basis for objection and rejection set forth in the Office Action. The specification and pending claims, as amended, are all believed to be in immediate condition for allowance. Accordingly, the withdrawal of all objections and rejections is respectfully requested. An allowance is earnestly sought.

If there are any other issues remaining, which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

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Respectfully submitted,

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